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**PRESCRIBING PATTERNS OF VARIOUS ANTIBIOTICS IN DENGUE FEVER**

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Dengue is a major public health issue globally. Dengue fever is a mosquito borne viral infection which has become a global health hazard, especially in tropical and subtropical areas. Children have higher risk of developing severe forms of dengue fever, antibiotics are mostly used to treat Dengue fever and minimize the symptoms.

**Materials and Methods**

The Present study was a observational study done among 107 patients who are admitted in a Private hospital in Warangal region. The study period was for duration of 2 months. Data was collected from the case files of patients who are admitted during study period.

**Results**

A total of 107 patients were included in this study. All the Patients had a confirmed diagnosis of Dengue fever with a positive NS1 or IgG, IgM status. The age range included cases from 1 year to 80 years. Majority of Patients were from the 1-20years (32.7%) and 21-40 years (30.8%) age group. Male patients were 42.05 % and Female patients were 57.9%.

In 107 prescriptions a total of 13 different types of antibiotics were prescribed and among them Cefepime 30 (28.0%), Doxycycline 25(23.3%), Ceftriaxone 16(14.9%), and Cefoperazone 8 (7.4%) is common.

**Conclusions**

Prescribing Pattern of Antibiotics in patients with Dengue Fever constituted single as well as combination drugs. Prescribing one or more antibiotics to treat self-limiting viral infections is

considered as inappropriate and may lead to the development of multidrug resistance. In our study Cephalosporin antibiotics were the mostly prescribed antibiotics. Early recognition of the disease, with a rational approach in case management leads good clinical outcome.

**Keywords: Antibiotics, Dengue fever, Prescribing patterns**

## INTRODUCTION

Dengue is a major public health issue globally [1]. Dengue is the Third most common monsoon disease in India [2], it is an acute viral illness caused by RNA virus of the Aedes mosquitoes family Flaviviridae. The number of dengue cases has increased 30-fold globally over the past five decades. Dengue is endemic in more than 100 countries and causes an estimated 50 million infections annually. In India the annual incidence is estimated to be 7.5 to 32.5 million [1].

Children have higher risk of developing severe forms of dengue fever. In India, DF (Dengue fever) has been an endemic for over two centuries, especially in the states of Delhi, Rajasthan, Haryana, Punjab, Maharashtra, Karnataka, Tamil Nadu and Pondicherry.

There are four distinct serotypes which include DENV-1, DENV-2, DENV-3, and DENV-4 All four serotypes can produce the full spectrum of the disease. Patients present with varied Symptomatology including onset of high fever with chills, severe retro-orbital headache, myalgia, arthralgia, rashes, loss of appetite, nausea and vomiting [3].

In the field of medicine, the battle between bacteria and mankind can be explained in three phases: the pre-antibiotic era, the antibiotic era, and the post-antibiotic era. The period before the introduction of Sulfa drugs and Penicillin is considered to be the 'Pre-antibiotic era.' Bacteria dominated mankind and bacterial infections were the leading cause of death. Discovery of penicillin by Sir Alexander Fleming in 1928 laid the foundation and hope of controlling bacterial infections. Since that time, the 'antibiotic era' has seen the discovery of many antibiotics, which has transformed modern medicine and saved millions of lives [2].

There is no specific treatment or antiviral therapy for dengue infections and WHO states that the management of dengue should be symptomatic and supportive. The mainstay of therapy is focussed on fluid management in order to avoid dehydration and its complications. Other symptoms are managed as needed. Blood products may be needed in patients having a serum platelet level  $<20,000/\mu\text{l}$  with profuse bleeding complications however, the benefits of transfusing are controversial among attending physicians [2].

## MATERIALS AND METHODS

This study was a prospective observational study carried out among the in-patients admitted in a Private hospital at Warangal region. The study period was for a duration of 2 months. Data was collected from the case files of patients admitted during study period. The cases which were included in this study were both male and female patients who were between the ages of 1 to 80 years having a confirmed NS1 or IgG or IgM positive status.

Patients who were clinically diagnosed/laboratory confirmed as dengue cases were included in this study. The drug use data was collected from the prescriptions records of the patients.

Individuals who are unable to give response due to serious physical or mental illness were excluded from the study.

## RESULTS

A total of 107 patients were included in this study. All the Patients had a confirmed diagnosis of Dengue fever with a positive NS1 or IgG, IgM status. The age range included cases from 1 year to 80 years. The majority of cases were from the 1-20 years (32.7%) and 21-40 years (30.8%) age group. Male patients were 42.05% and Female patients were 57.9%.

Of 107 Patients, (20 %) patients were diagnosed based on NS1 Antigen, followed by IgM (45%) and IgG (40%) antibodies (**Table 2**).

Of 107 patients, majority had <1.5 lakhs platelets count. Among all age groups of patients, 1 to 20 years and 21 to 40 years age group patients had <1.5 lakhs (**Table 3**).

Among the antibiotics prescribed, Cefepime (28.0 %), Doxycycline (23.3%) and Ceftriaxone (14.9%) were most commonly used (**Table 4**).

In this study different pattern of Antibiotics are prescribed based on the all age group included in the study. The most commonly used antibiotics were cefepime, Doxycycline, Ceftriaxone and Cefoperazone (**Table-5**).

Cefepime was widely used antibiotic and highest percentage of cefepime use was observed at the age of 21-40 years (41.37%), followed by 61-80 years (24.13%), 1-20 years (20.68%) and least is at the age of 41-60 (13.7%). Highest percentage of Doxycycline use was observed at the age group of 21-40 years (40%), followed by 41-60 years (36.6%), 1-20 years (16.6%) and least is at the age of 61-80 years (6.6%)

Highest percentage of ceftriaxone use was observed at the age of 1-20 years (35%), 41-60 years (30%), 21-40 (25%) and least is at the age of 61-80 (10%).

Highest percentage of cefoperazone use was observed at the age group of 1-20 and 41-60 years (40%), 21-40 years (20%) and least is at the age of 61-80 (0%).

Among 107 patients, 71 patients were prescribed with combination of antibiotics (66.35%). Most commonly prescribed combination drug was cefepime and

tazobactam followed by Ceftriaxone and tazobactam, Cefoperazone and sulbactam (Table 6).

**Table 1: Demographic Data of study population**

Age ( in years )	%
1 to 20	(32.7%)
21 to 40	(30.8%)
41 to 60	(18.6%)
61 to 80	(17.7%)

**Table 2: Other parameters**

NSI Antigen	IgG Antibody	IgM Antibody
22/107 (20.5%)	40/107 (37.3%)	45/107 (42.0%)

**Table 3: Evaluation of Platelet count based on age group**

Age group (in years)	Platelet count	
	<1.5 Lakhs	>1.5 Lakhs
1-20	26	9
21-40	23	8
41-60	24	6
61-80	7	4

**Table 4: Antibiotic Prescribing Pattern**

Antibiotic	%
Cefepime	28.0
Doxycycline	23.3
Ceftriaxone	14.9
Cefoperazone	7.4
Ornidazole	7.4
Amoxicillin	4.6
Amikacin	4.6
Ampicillin	3.7
Cefpodoxime	1.8
Meropenem	0.9
Levofloxacin	0.9
Metronidazole	0.9
Cefixime	0.9

**Table 5: Prescription pattern of antibiotics based on age group**

Age group (Years)	Antibiotics prescribed			
	Cefepime	Doxycycline	Ceftriaxone	Cefoperazone
1 to 20	06	05	07	04
21 to 40	12	12	05	02
41 to 60	04	11	06	04
61 to 80	07	02	02	0

**Table 6: Combination of antibiotics**

Combination of antibiotics	Number of patients
Cefepime + tazobactam	29
Ceftriaxone + tazobactam	14
Cefoperazone + sulbactam	16
Amoxicillin + potassium clavulanic acid	5
Ofloxacin + ornidazole	7

## DISCUSSION

The study was conducted to identify the different prescribing patterns of antibiotics in dengue fever. Data obtained was classified according to age, diagnostic data and type of antibiotics prescribed. In this study, the majority of patients were between the ages of 1 to 20 years were mostly effected with dengue fever.

In the present study 42.05% were male and 57.9 % were female. Similar findings are observed in a study conducted by Smita Bhandare *et.al.*, [1] found that female were more affected than male.

According to Khoa T. D. Thai *et.al.*, [4] adolescents and young adults are more likely to develop symptomatic dengue than younger individuals, e.g., primary school children. Similarly in our study adolescents and young adults among the age group of 1-20 years and 21 to 40 years were effected with dengue fever.

In our study dengue test was found positive –IgG (37.3%), IgM (42%) and NS1 (20.5%) while contrary in a study by, Anubrata Paul *et.al.*, [5] IgG, IgM were less and NS1 is more in percentage. According to Anubrata Paul *et.al.*, [5] Negative NS1 antigen results may occur if the specimen was collected >7 days following symptom onset.

In such cases, Serologic testing is recommended to detect the presence of IgM and IgG antibodies to dengue virus.

Comparatively, if the diagnosis of dengue virus infection is conducted within the first five days of illness, NS1 test is an effective method than antibody tests. However, there will be an increase in the sensitivity of diagnosis from sixth day.

A study conducted by Deepti Pruthvi *et.al.* [6] concluded that in most of the patients platelet count was decreased <1.5 Lakhs. In our study similar observation was made. As per our study among total population, majority of patients were found to have decreased platelet count (<1.5 lakhs) in Dengue fever.

As per study conducted by Elzinandes Leal de Azeredo *et.al.*, [7] during the early phase of disease, bone marrow displays hypocellularity and attenuation of megakaryocyte maturation and suppression of megakaryocytes leads to decreased platelet count.

According to the *WHO Clinical Guidelines* [8] and *the 2014 NVBDCP Guidelines* [9] there is no drug of choice for dengue, as drugs that directly act against dengue virus are still in the pipeline [10] Hence, therapy is solely based on the management of symptoms. Accurate diagnosis of dengue can be confirmed based on serum positivity for NS1 antigen, IgM, and IgG antibodies.

In our study we concluded that among the total antibiotics prescribed, Cefepime, Doxycycline and Ceftriaxone were most commonly prescribed antibiotics. In present

study most commonly prescribed antibiotics belong to cephalosporins which is similar to the study conducted by Narasimha Kumar Gv *et.al.*, [11].

Antibiotics like amikacin, doxycycline and amoxicillin should not be used without performing susceptibility tests, while ceftriaxone and cefixime cannot be used prior to performing hypersensitivity tests [12-14]. Azithromycin, ceftriaxone, and metronidazole can only be used for the prophylaxis of endocarditis and sexually transmitted diseases [15, 16]. In addition, usage of amoxycylav in dengue can further increase the risk of bleeding [13].

A study Conducted by Khaled M Alakhali *et.al.*, [17] stated that most of the patients were prescribed with combination of antibiotics. Similarly in our study 66.35 % were prescribed with combination of antibiotics. Cephalosporins group was mostly prescribed due to their broad spectrum of activity.

## CONCLUSION

Our Study shows that Single or combination of antibiotics are Prescribed for Dengue. Prescribing one or more antibiotics to treat self-limiting viral infections is considered as inappropriate and may lead to the development of multidrug resistance. In our study Cephalosporin antibiotics were the mostly prescribed antibiotics as well as the most preferred for combination therapy among Dengue patients. Results from this

study show that the mainstay of treatment for DF in our study population is with supportive and symptomatic measures in the form of antibiotic management. Early recognition of the disease, with a rational approach in case management leads good clinical outcome.

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